General Specifications

Electrical Capacity (Resistive Load)

For MRA: 250mA @ 125V AC
For MRF or MRK: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: Find additional explanation of operating range in Supplement section.

Other Ratings

Contact Resistance: 10 milliohms maximum for MRA; 50 milliohms maximum for MRF & MRK
Insulation Resistance: 100 megohms minimum @ 500V DC
Dielectric Strength: 1,000V AC minimum for 1 minute minimum for MRA
500V AC minimum for 1 minute minimum for MRF & MRK
Mechanical Life: 30,000 operations minimum
Electrical Life: 10,000 operations minimum
Range of Operating Torque: 0.02 ~ 0.07Nm for MRA; 0.005 ~ 0.02Nm for MRF & MRK
Contact Timing: Nonshorting (break-before-make)
MRA – self-cleaning, sliding contact; MRF & MRK – self-cleaning, rotary contactor disk
Indexing: 30°

Materials & Finishes

Shaft: Brass with nickel plating
Stopper Plate: Steel with zinc plating for MRA & MRK; polyamide cover with stopper for MRF
Bushing/Housing: Zinc alloy with zinc plating
Movable Contacts: Copper with silver plating for MRA; phosphor bronze with gold plating for MRF & MRK
End Contacts & Terminals: Brass with silver plating for MRA; phosphor bronze with gold plating for MRF & MRK
Common Contacts & Terminals: Brass with silver plating for MRA; phosphor bronze with gold plating for MRF & MRK
Base: Diallyl phthalate for MRA; fiberglass reinforced polyamide for MRF & MRK

Environmental Data

Operating Temperature Range: –10°C through +70°C (+14°F through +158°F)
Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)
Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
Shock: 50G (490m/s^2) acceleration (tested in 3 right angled directions, with 3 shocks in each direction)
Sealing: MRK model meets IP67 of IEC60529 standards

Installation

Mounting Torque: .686Nm (6.08 lb•in)
Cap Installation Force: 19.6 ~ 29.4N (4.41 ~ 6.61 lbf) for MRA & MRK

Processing

Soldering Time & Temperature: Wave Soldering for MRA: See Profile A in Supplement section.
Wave Soldering for MRF & MRK: See Profile B in Supplement section.
Manual Soldering for MRA: See Profile A in Supplement section.
Manual Soldering for MRF & MRK: See Profile B in Supplement section.
Cleaning: Automated cleaning recommended. Stopper plate, as well as washers for MRA & MRK, must be in place to maintain automated cleaning. See Cleaning specifications in Supplement section.

Standards & Certifications

MRA, MRF, & MRK models have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

Distinctive Characteristics

Low profile body of MRF model accommodates space limitations required for PCB mounting. For the MRA and MRK bushing mount models, the range of behind panel body depths is .323″ to .669″ (8.2mm to 17.0mm).

Positive detent mechanism for distinct feel and audible feedback.

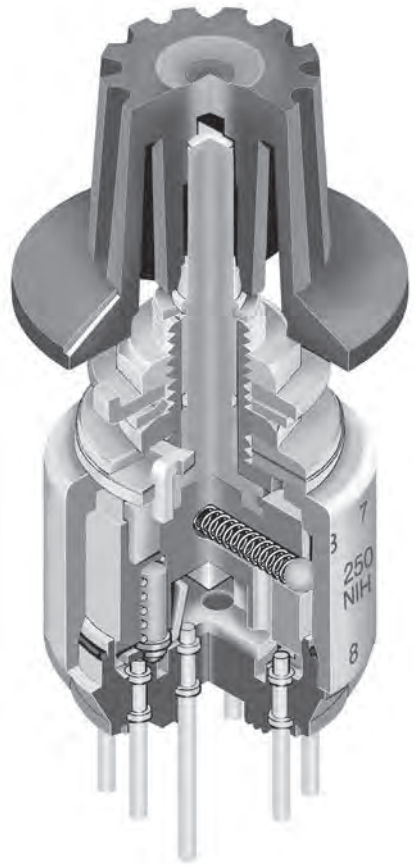
Metal bushing and housing construction increases durability.

Adjustable stopper plate allows 2–12 position settings.

High contact reliability achieved by the self-cleaning contact mechanism.

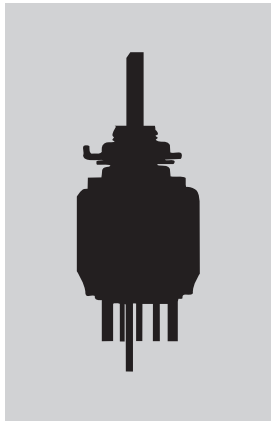
Break-before-make contact timing with sliding contacts in MRA and rotary contactor disk in MRF and MRK models.

Interior housing seal and molded-in PC terminals, plus shaft rubber o-ring on MRA and MRK and polyamide cover on MRF model, allow cleaning after automated soldering.



MRK model meets IP67 of IEC60529 specifications (similar to NEMA 4 & 13).

Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

MR [A] [206] — [A] [ ]

Actuators & Terminals	
A	Shaft Actuated with PC Terminals
F	Low Profile Screwdriver Actuated with PC Terminals
K	Low Profile Shaft Actuated with PC Terminals

Poles & Circuits	
112	SP with 2-12 Positions
206	DP with 2-6 Positions
403	4P with 2-3 Positions

Knobs	
A	Plain Black
B	Small Color Tipped
C	Large Color Tipped

Colors	
For Plain Knob	
No Code	Black
For Color Tipped	
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MRA206-A

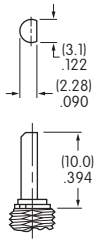
Shaft Actuated with Plain Black Knob

DP with 2-6 Adjustable Positions

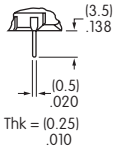
PC Terminals

ACTUATORS & TERMINALS

A Shaft Actuated with PC Terminals

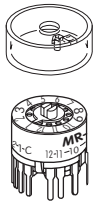


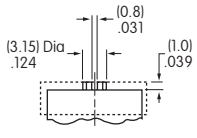
Shaft



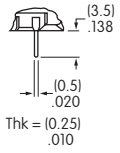
Terminal

F Low Profile Screwdriver Actuated with PC Terminals



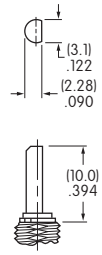


Slotted for Screwdriver

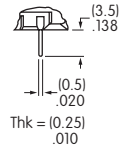


Terminal

K Low Profile Shaft Actuated with PC Terminals

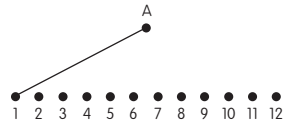
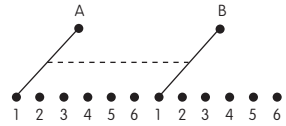
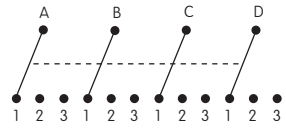


Shaft



Terminal

POLES & CIRCUITS

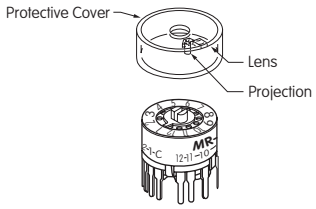
Pole	Model	Number of Positions	Stopper Settings	Number of Terminals	Schematics
SP	**MRA112**	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
	MRF112	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
	MRK112	2–12	2, 3, 4, . . . 12	1 COM, 12 LOAD	
DP	**MRA206**	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
	MRF206	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
	MRK206	2–6	2, 3, 4, 5, 6	2 COM, 12 LOAD	
4P	**MRA403**	2–3	2, 3	4 COM, 12 LOAD	
	MRF403	2–3	2, 3	4 COM, 12 LOAD	
	MRK403	2–3	2, 3	4 COM, 12 LOAD	

POSITION SETTING FOR MRA, MRF, & MRK MODELS

Each switch is supplied with the stopper set for the maximum number of positions allowed for that model. Prior to installation, the desired position setting should be made. Contact factory for continuous rotation.

MRF Models

1. Remove the protective cover from the switch body.
2. Turn the shaft counterclockwise to the extreme left by using a screwdriver.
3. Inside the cover is a magnifying lens which would be positioned over the number which is to be the maximum position used; when the cover is then snapped into the switch, the projection beside the lens fits into the correct hole for setting the stop.



MRK & MRA Models

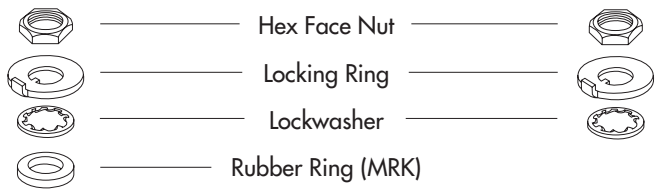
1. Using the actuator knob, turn the shaft counterclockwise to the extreme left. If the shaft is not turned counterclockwise to the extreme left, proper setting cannot be achieved. At this extreme position, the white line on the knob points to the number 1 position shown on the side of the switch.

2. Remove the knob from the shaft and loosen the nut far enough to allow raising the stopper plate, plus washer(s), for resetting to the desired position.

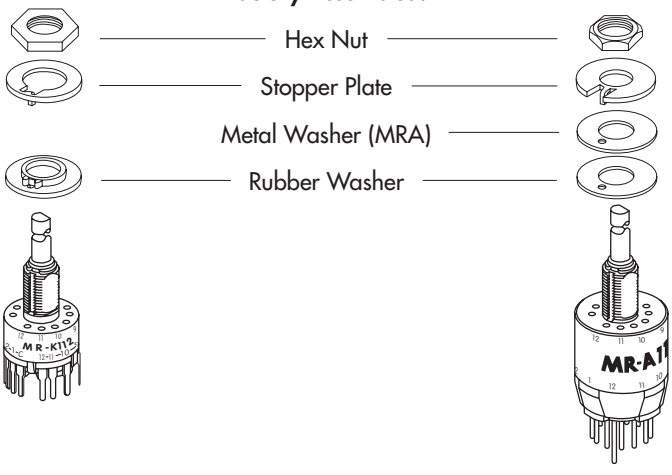
3. Note the position numbers on the side of the switch; these correspond to the terminal numbers and stopper holes. Insert the stopper in the hole numbered for the maximum desired number of stop settings. Satisfactory switch functioning cannot be assured if the stopper plate is not properly positioned.

4. Tighten the nut (beveled side up) firmly against the stopper plate.

Standard Mounting Hardware Packaged Loose with Each Switch:



Factory Assembled:

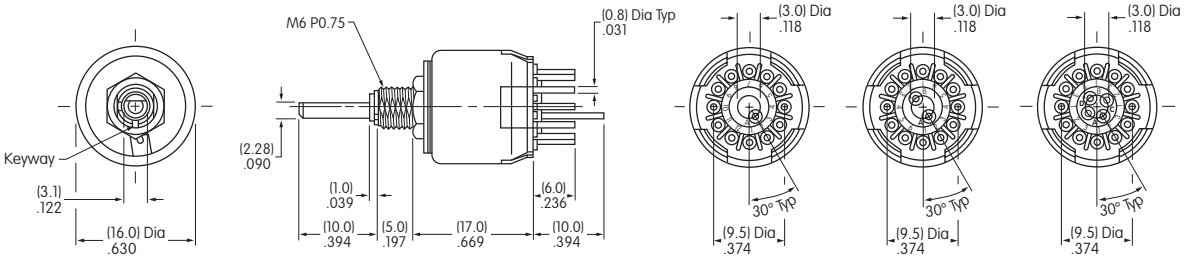


TYPICAL SWITCH DIMENSIONS

MRA • PC Terminals

1 Pole 2 Pole 4 Pole

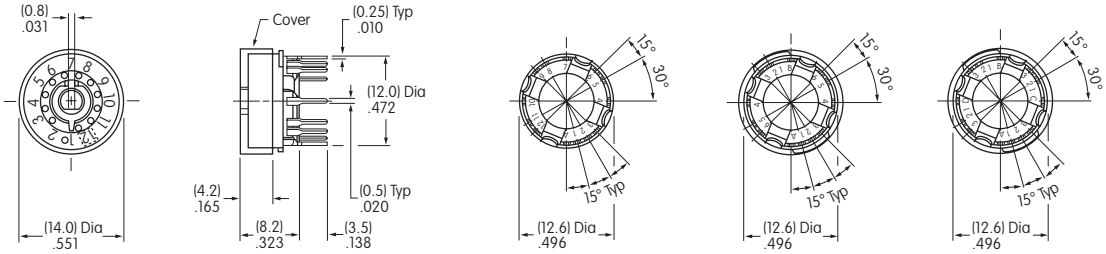
MRA112



MRF • PC Terminals

1 Pole 2 Pole 4 Pole

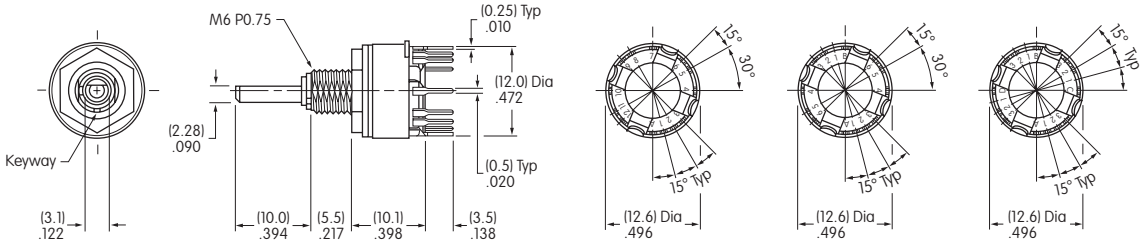
MRF403



MRK • PC Terminals

1 Pole 2 Pole 4 Pole

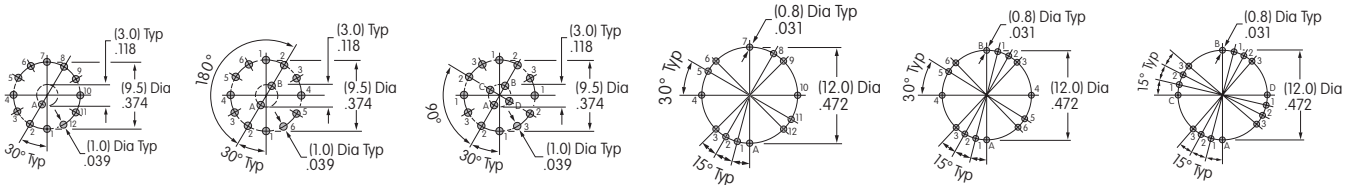
MRK112



MRK devices are designed to be panel mounted. Installation without panel mounting will affect reliability.

FOOTPRINTS

Single Pole MRA112	Double Pole MRA206	Four Pole MRA403	Single Pole MRF112 MRK112	Double Pole MRF206 MRK206	Four Pole MRF403 MRK403

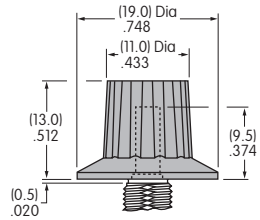


KNOBS

A **AT433**
Plain Black

Material:
Polyacetal

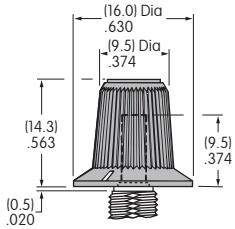
Color:
Black
only



B **AT4103 Small**
Color Tipped

Base Material:
Polyester
Base Color:
Black

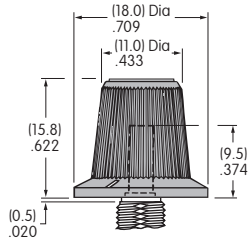
Polyamide Tip
Colors:
A, B, C, E, F, G, H



C **AT4104 Large**
Color Tipped

Base Material:
Polyester
Base Color:
Black

Polyamide Tip
Colors:
A, B, C, E, F, G, H



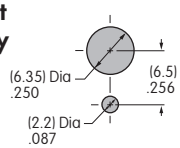
Color Codes: **A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue **H** Gray

PANEL CUTOUTS & MAXIMUM EFFECTIVE PANEL THICKNESS

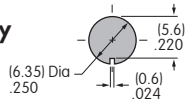
MRA & MRK

Nonsealed Panel

Without Keyway

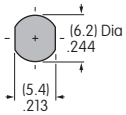


With Keyway



MRK

Sealed Panel



With Standard Hardware on Nonsealed Panel:
MRA .067" (1.7mm) MRK .087" (2.2mm)

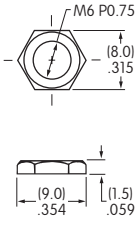
Without Locking Ring on Nonsealed Panel:
MRA .098" (2.5mm) MRK .118" (3.0mm)

With AT513M & AT535 only on Sealed Panel:
MRK .106" (2.7mm)

STANDARD MOUNTING HARDWARE

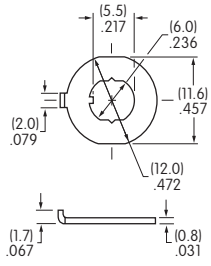
AT513M
Metric Hexagon Nut

Material:
Brass, nickel plating
1 for MRA; 1 for MRK



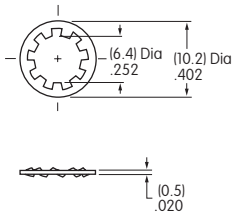
AT545
Locking Ring

Material:
Steel, chromate over zinc plating
1 for MRA; 1 for MRK



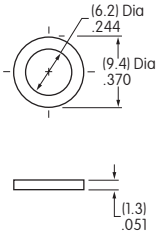
AT509
Lockwasher

Material:
Steel, chromate over zinc plating
1 for MRA; 1 for MRK



AT535
Rubber Ring

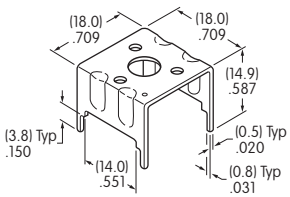
Material:
Nitrile butadiene rubber
1 for MRK

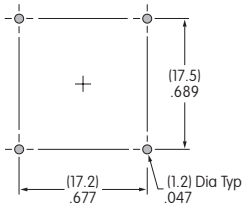


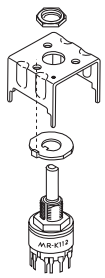
OPTIONAL SUPPORT BRACKET

AT543
Support Bracket for MRK

Material:
Steel with tin plating







A support bracket is needed when the MRK is mounted only to a PC board and does not have the bushing through a panel.

General Specifications

Electrical Capacity (Resistive Load)

For MRX: 2A @ 125V AC or 1A @ 30V DC

For MRY: For MRY106G: 0.4VA maximum @ 28V AC/DC maximum
(Applicable Range 0.1mA ~ 0.1A @ 20mV ~ 28V)
Note: See Supplement Index to find explanation of operating range.
For all other MRY models: 3A @ 125V AC or 2A @ 30V DC

For MRT: For MRT22: 10A @ 125V AC or 4A @ 30V DC
For MRT23: 5A @ 125V AC or 3A @ 30V DC

Other Ratings

Contact Resistance: 10 milliohms maximum for MRX, MRY, & MRT; 20 milliohms maximum for MRY106G

Insulation Resistance: 100 megohms minimum @ 500V DC for MRX & MRY
200 megohms minimum @ 500V DC for MRT

Dielectric Strength: 1,000V AC minimum for 1 minute minimum

Mechanical Life: 15,000 operations minimum

Electrical Life: 7,500 operations minimum

Range of Operating Torque: 0.03 ~ 0.15Nm for MRX; 0.02 ~ 0.10Nm for MRY; 0.02 ~ 0.05Nm for MRT

Contact Timing: Nonshorting (break-before-make)
MRX: Self-cleaning, sliding contact; MRY: Rotary contactor dish; MRT: Butt contacts

Indexing: 45° for MRX; 60° for MRY; 120° for MRT22; 60° for MRT23

Materials & Finishes

Shaft: Brass with nickel plating

Stopper Plate: Steel with zinc plating for MRX & MRY

Bushing/Housing: Brass with nickel plating

Movable Contacts: Silver alloy for MRX & MRT; copper with silver plating for MRY106;
copper with gold plating for MRY106G

End Contacts & Terminals: Silver alloy & copper with silver plating for MRX & MRT; silver alloy plus brass with silver plating for MRY106; silver alloy with gold plating for MRY106G

Common Contacts & Terminals: Copper with silver plating for MRX, MRY106 & MRT22; brass with gold plating for MRY106G; brass with silver plating for MRT23

Base: Phenolic resin

Environmental Data

Operating Temperature Range: –10°C through +70°C (+14°F through +158°F)

Humidity: 90 ~ 95% humidity for 96 hours @ 40°C (104°F)

Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours

Shock: 50G (490m/s^2) acceleration (tested in 3 right angled directions, with 3 shocks in each direction)

Installation

Mounting Torque: .686Nm (6.08 lb•in)

Cap Installation Force: 19.6 ~ 29.4N (4.41 ~ 6.61 lbf)

Soldering Time & Temperature: Manual Soldering: See Profile A in Supplement section.

Standards & Certifications

UL: **File No. E44145 - Recognized only when ordered with marking on switch.**
Add "/U" or "/CUL" before dash in part number to order UL recognized switch.
MRT22 models recognized at 10A @ 125V AC; MRT23 models recognized at 5A @ 125V AC

Distinctive Characteristics

Positive detent mechanism for distinct feel and audible feedback.

Metal bushing and housing construction increases durability.

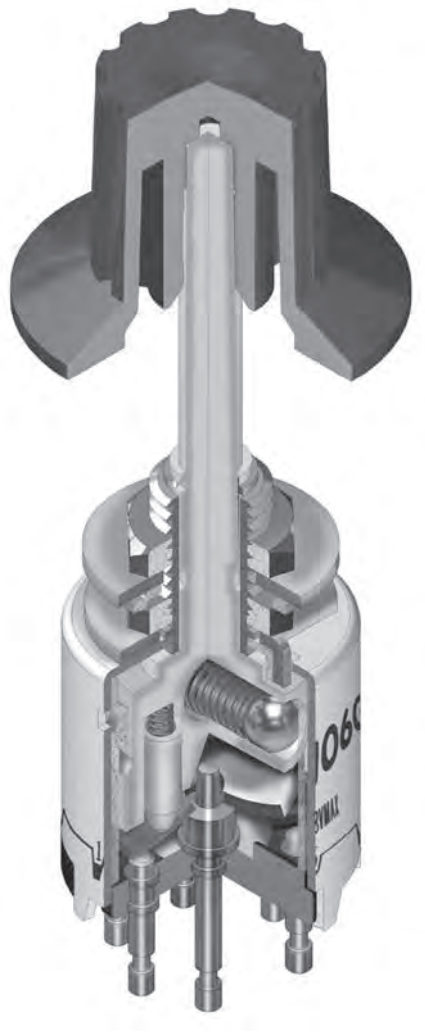
Adjustable stopper plate allows 2-8 position settings.

High contact reliability achieved by the self-cleaning contact mechanism.

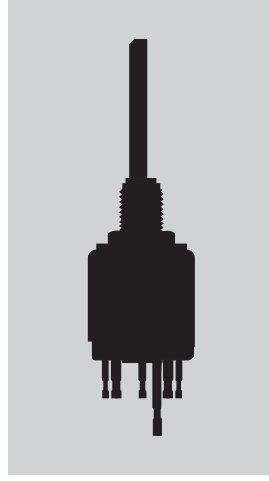
Break-before-make contact timing with various mechanism types: sliding contacts in MRX, contactor dish in MRY, and butt contacts in MRT models.

Terminal types include PC-turret for MRX, turret for MRY, and solder lug for MRT models.

Molded-in PC-turret and turret terminals prevent entry of flux and other contaminants.



Actual Size



TYPICAL SWITCH ORDERING EXAMPLE

MR [X] [108] — [A] [ ]

Actuators & Terminals

X	Shaft Actuated with PC-Turret Terminals
Y	Shaft Actuated with Turret Terminals
T	Shaft Actuated with Solder Lug Terminals

Poles & Circuits

108	SP with 2-8 Positions
204	DP with 2-4 Positions
402	4P with 2 Positions
106	SP with 2-6 Positions
106G	SP with 2-6 Positions Gold Contacts 0.4VA
22	DPDT ON-NONE-ON
23	DPDT ON-OFF-ON

Knobs

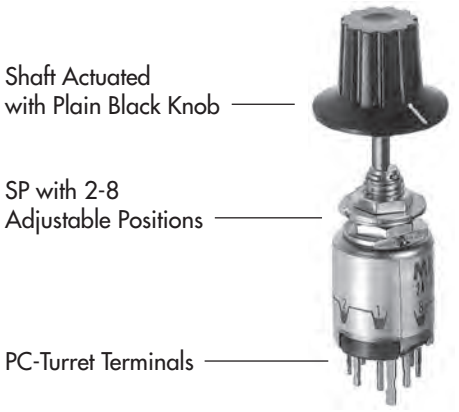
A	Plain Black
B	Small Color Tipped
C	Large Color Tipped

Colors

For Plain Knob	
No Code	Black
For Color Tipped	
A	Black
B	White
C	Red
E	Yellow
F	Green
G	Blue
H	Gray

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

MRX108-A

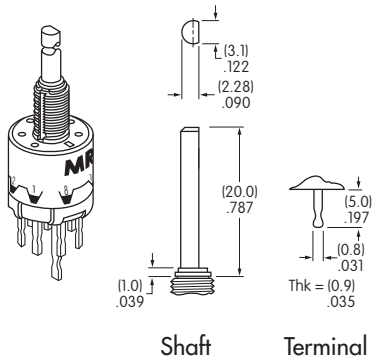


IMPORTANT:

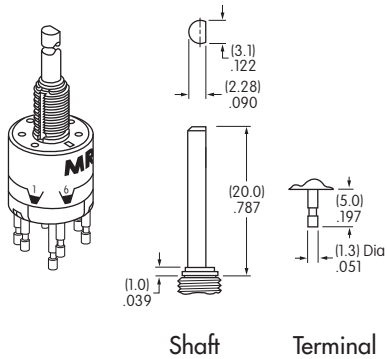
MRT Switches are supplied without UL & cULus marking unless specified.
UL & cULus recognized only when ordered with marking on the switch.
Specific models, ratings, & ordering instructions are noted on the General Specifications page.

ACTUATORS & TERMINALS

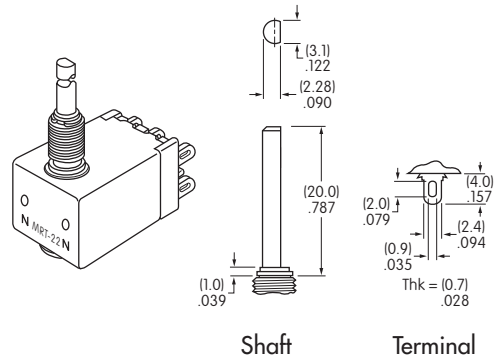
X **Shaft Actuated with PC-Turret Terminals**



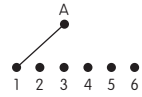
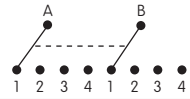
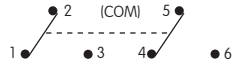
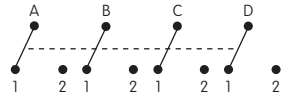
Y **Shaft Actuated with Turret Terminals**



T **Shaft Actuated with Solder Lug Terminals**



POLES & CIRCUITS

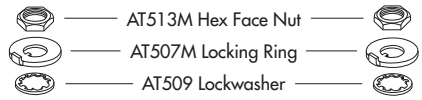
Pole	Model	Number of Positions	Stopper Settings	Number of Terminals	Schematics
SP	**MRX108**	2-8	2, 3, 4, 5, 6, 7, 8	1 COM, 8 LOAD	
	MRY106 **MRY106G**	2-6	2, 3, 4, 5, 6	1 COM, 6 LOAD	
DP	**MRX204**	2-4	2, 3, 4	2 COM, 8 LOAD	
DPDT	**MRT22**	2	ON-NONE-ON	2-3 2-1 5-6 5-4	
	MRT23	3	ON-OFF-ON	2-3 OPEN 2-1 5-6 OPEN 5-4	
4P	**MRX402**	2	1 & 2	4 COM, 8 LOAD	

POSITION SETTING FOR MRX & MRY MODELS

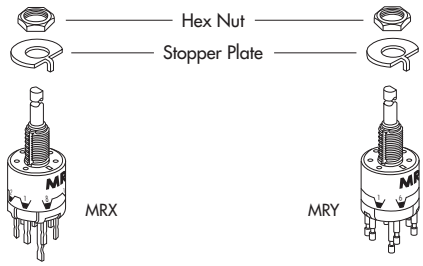
Each switch is supplied with the stopper set for the maximum number of positions allowed for that model. Prior to installation, the desired position setting should be made. Contact factory for continuous rotation.

1. Using the actuator knob, turn the shaft counterclockwise to the extreme left. If the shaft is not turned to this extreme position where the white line on the knob points to the number 1 position shown on the side of the switch, proper setting cannot be achieved.
2. Remove the knob from the shaft and loosen the nut far enough to allow raising the stopper plate for resetting to the desired position.
3. Note the position numbers on the side of the switch; these correspond to the terminal numbers and stopper holes. Insert the stopper in the hole numbered for the maximum desired number of stop settings. Satisfactory switch functioning cannot be assured if the stopper plate is not properly positioned.
4. Tighten the nub (beveled side up) firmly against the stopper plate.

Mounting Hardware
Packaged Loose with Each Switch

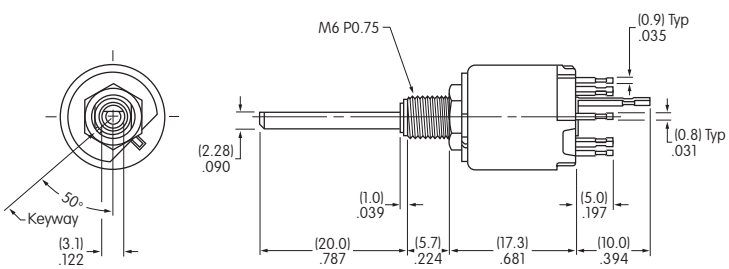


Factory Assembled:

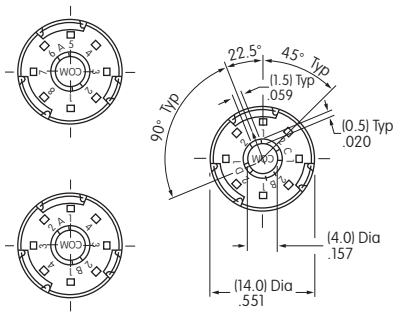


TYPICAL SWITCH DIMENSIONS

Single, Double & Four Pole



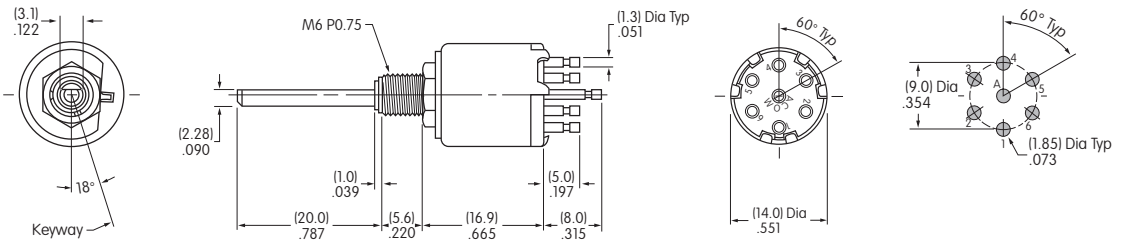
MRX • PC-Turret Terminals



MRX108

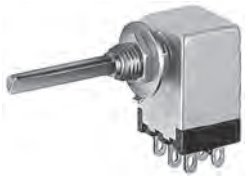
TYPICAL SWITCH DIMENSIONS

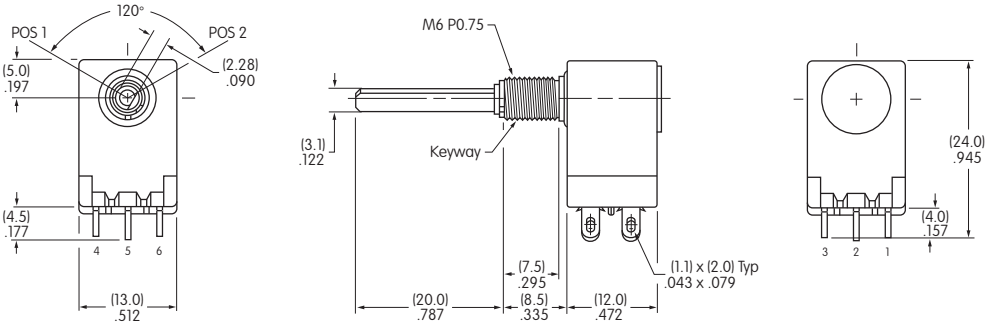
MRY • Turret Terminals — Single Pole



MRY106

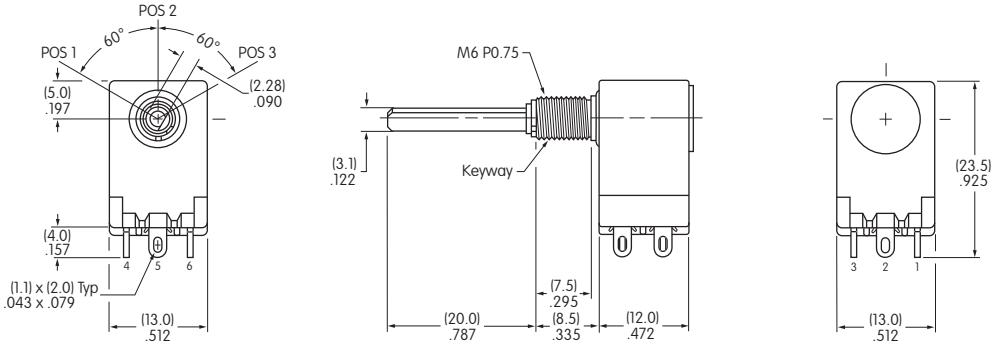
MRT • Solder Lug Terminals — Double Pole





MRT22

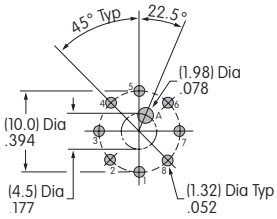
MRT • Solder Lug Terminals — Double Pole



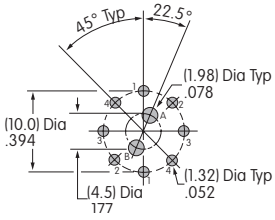
MRT23

PC FOOTPRINTS FOR MRX SINGLE, DOUBLE, & FOUR POLE

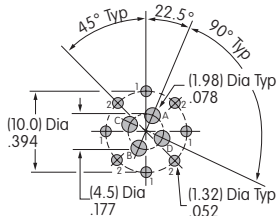
Single Pole



Double Pole

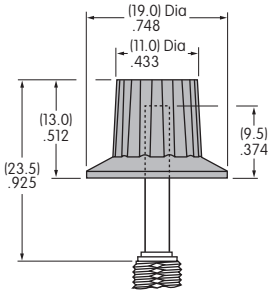


Four Pole



KNOBS

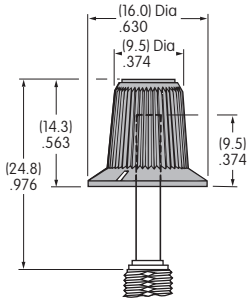
A **AT433**
Plain Black



Material: Polyacetal

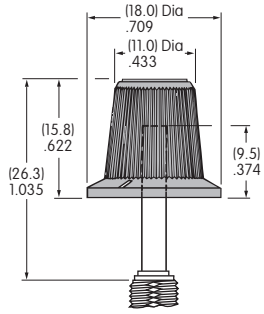
Color: Black only

B **AT4103 Small**
Color Tipped



Base Material: Polyester
Base Color: Black
Polyamide Tip
Colors: A, B, C, E, F, G, H

C **AT4104 Large**
Color Tipped

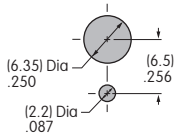


Base Material: Polyester
Base Color: Black
Polyamide Tip
Colors: A, B, C, E, F, G, H

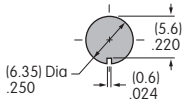
Color Codes: **A** Black **B** White **C** Red **E** Yellow **F** Green **G** Blue **H** Gray

PANEL CUTOUTS & MAXIMUM EFFECTIVE PANEL THICKNESS

Without Keyway



With Keyway



Maximum Effective Panel Thickness

With Standard Hardware: MRX & MRY .095" (2.4mm); MRT .106" (2.7mm)

Without Locking Ring: MRX & MRY .126" (3.2mm); MRT .138" (3.5mm)